

Summary Report

Cigarette Consumption in Washington State

January 1997



Summary Report

Cigarette Consumption in Washington State

December 1996

Economic models and technical report by:

Thomas M. Clarke, PhD

Summary report edited by:

Don Martin

Acknowledgments:

Washington Department of Health:

Steve Bowman

Juliet Van Eenwyk

Jeanette Stehr-Green

Washington Department of Revenue:

Gary O'Neil

William Chamberland

Don Guttman

Robert Jaffe, MD

Rachel Grossman

Sheila Burrows

Brenda Suiter

Robert Wood Johnson Foundation



For copies of the summary report or the
full technical report:

Tobacco Prevention Program

P.O. Box 47835

Building 10 Airdustrial Park

Olympia, WA 98504-7835

360-753-4312

FAX 360-664-8779

Regulation of cigarette smoking is a complex policy issue affecting public health, commerce and state revenue, as well as Native American tribes and the military. The debate positions the tobacco industry, intent on controlling the price of its product and attracting new customers, against state governments, burdened with staggering costs to public and personal health.

The role of excise taxes in lowering tobacco consumption is a recent focus in this debate. Public health advocates argue that whenever the price of cigarettes goes up, consumption goes down, and so tobacco taxes can be an effective tool for policymakers in lowering the prevalence of smoking. The tobacco industry counters that higher taxes simply increase illegal consumption, foiling the desired health goal, and resulting in loss of revenue to a state.

In 1993, the Washington legislature significantly increased tobacco taxes in order to fund health care reform measures. Since smoking exacts such a heavy toll on health, taxing it to raise revenues for health reform efforts made sense to the majority of lawmakers. The added benefit of lowering the smoking rate was weighed against anti-tax sentiment. The question now is what effect this tax increase had on consumption and revenues. There are no direct data on illegal consumption (sales that evade taxes either through smuggling or purchases on Indian reservations and military bases for people who are not eligible to receive the tax exemption). A national study done in 1985 presented a model for estimating cigarette tax evasion and determining the impact of tobacco tax increases.

This document is a summary of a report by Thomas M. Clarke, PhD, at the Washington State Department of Health (DOH). Dr. Clarke examined the 1985 national study, used the methodology to update national and state cigarette consumption estimates for 1995, and presented specifications for a model Washington can use in the future to estimate the impact of tax increases. In 1996, the Washington State Department of Revenue adopted Dr. Clarke's model for estimating consumption. For a copy of his technical report, entitled "Cigarette Consumption In Washington State," contact the Washington Department of Health.

Significant findings of the DOH study show:

- Washington's cigarette consumption rate is well below the national average and has dropped since 1985.
- A price increase on cigarettes from taxes reduces consumption more than it increases tax evasion, and in the long run (after six months) the gap widens in favor of reduced smoking.
- Even large tax increases can reduce smoking effectively without excessive tax evasion.
- On balance the state doesn't lose revenue from tax evasion. The net result of a tax increase is greater tax revenue.
- Estimated taxed sales in Washington have declined steeply, from over 100 packs per capita in 1983 to under 70 in 1995.
- Level of education is a very important factor in reducing cigarette consumption.
- If the policy goal is to reduce tobacco consumption, excise tax increases can be carefully crafted to result in net revenue gains.

Background

The original study, which estimated per capita cigarette consumption by state, was conducted by the Advisory Commission on Intergovernmental Relations (ACIR) in 1985 using 1983 data. The model developed by ACIR was a continuation of research efforts begun in 1975. The 1985 study uses a linear multiple regression model which is a standard, well understood economic model. It takes into account such variables as prices and demographics that are statistically significant determinants of consumption, and calculates each state's total cigarette consumption. By estimating tobacco consumption in packs per capita, it is possible to see how each state compares to the national average. The model also makes it possible to estimate tax evasion, and to predict the effect of a hypothetical tax increase on consumption and tax evasion.

The 1985 ACIR study, the DOH 1995 national model, and the DOH Washington state model are technical economic models. In summarizing the findings, it is not our intention to oversimplify the complexity of these models. Some key terms in these studies are important to understand.

Key Terms

Consumption means purchases of packs of cigarettes and is figured in packs per capita for each state.

Taxed consumption means legal sales of cigarettes where state and local taxes are collected.

Total consumption is a combination of regular taxed sales, tax-exempt sales, such as on Indian reservations and military bases, and illegal consumption that evades taxes.

Illegal consumption has two parts: 1) illegal flows across state borders where price differentials exist; and 2) that portion of the tax-exempt sales which is made by or for persons who are not eligible to receive the exemption. This means individuals who purchase cigarettes on Indian reservations and are not enrolled members of the tribes, and military personnel who buy cigarettes from base commissaries for friends or acquaintances.

Price elasticity measures the percentage reduction in consumption that results from a percentage increase in price.

The ACIR used a regression model to predict how behavior would respond to changes such as a tax increase. One should not interpret these predictions as precise estimates, but as point estimates within a range of uncertainty.

1985 ACIR study

The 1985 national model examined research literature to identify economic, demographic and cultural influences on cigarette consumption. The model was based on people age 18 years and older. Statistically significant variables were carefully tested and account for the relatively high degree of accuracy of the model. Variables that were found to be statistically significant in 1985 included:

- **state and local tax rates and price differential**—a complicated index that accounts for tax evasion where prices or taxes are different between neighboring states.
- **per capita income**—higher income generally means more demand and higher cigarette consumption.
- **tourism**—purchases by non-residents can skew results, particularly in states with small populations and high levels of tourism, such as Nevada.
- **percent of the population that is Asian**—as a whole, Asians have much lower age-adjusted lung cancer rates, indicating much lower smoking prevalences. It is noted, however, that this is a large and diverse population, and some sub-groups may have higher smoking rates.
- **percent of the population that is Hispanic**—nationally, Hispanics have persistently lower smoking prevalences than other races or ethnicities.
- **percent of the population that is Mormon or Seventh Day Adventist**—members of these religious faiths have much lower smoking rates, and where their numbers are high, they can affect the per capita consumption rate.
- **regional differences**—certain areas of the country have extremely high consumption rates, either from cultural influences or because they are suppliers of cigarettes to surrounding states.

It is interesting to note that on a national scale certain variables were found not to be significant in 1985:

- **all sales on Indian reservations and military bases**—there was a lack of uniformity in illegal sales which made it difficult to model. Also the magnitude of these sales nationally appeared to be small.
- **percent of the population that is African American**—much higher smoking rates for black males compared to other races and ethnicities were cancelled out by much lower rates for black females.

In the ACIR study, the national average for total consumption was estimated at 115 packs per capita in 1983. Washington's per capita consumption was 102 packs or 89% of the national average. The 1985 study concluded that nationally, when the price of tobacco goes up, about 75% of the estimated reduction in consumption (price elasticity) is due to the price increase, and that only about 25% is due to tax evasion, though this may vary widely from state to state.

Since 1985, several key variables in the ACIR study have changed significantly. The most important of these for Washington is the large increase in the cigarette excise tax passed by the legislature in 1993. Updating the estimate of consumption was a crucial first step in being able to determine whether the steep reductions in taxed sales that Washington has experienced are the result of higher prices or increased tax evasion.

1995 National Model

The DOH 1995 national study carefully examined the previous model and made some adjustments in the variables. For example, tourism was no longer a significant variable and regional differences had shifted. Perhaps the most important change was the influence of education. Research literature since the early 1980s notes that people with higher levels of education are, by far, less likely to smoke. Therefore, a new variable was added in the 1995 model for the percentage of the population with a bachelor's degree or higher. Refer to the full report for other technical changes. Like the 1985 national model, this model provides long-run estimates (i.e., more than six months into the future).

The results show:

- Washington's total consumption has declined from 89% of the national average in 1985 to 86% in 1995.
- Despite large tax increases in Washington since 1985, non-taxed consumption decreased.
- Once again, non-taxed sales on Indian reservations and military bases are not significant on a national level.

The DOH Washington Model

The Washington model starts from the 1995 national study, but also attempts to look at consumption over time. It is considered a short-run model (less than six months). There are fewer variables, but the standard error is much lower. The estimates from the Washington model very closely match those from the national model.

A significant drop in non-taxed sales occurred after a 1980 court ruling which prohibited non-tribal members from purchasing cigarettes on Indian reservations. For ten years estimated non-taxed sales remained fairly stable, then increased sharply beginning in 1993 when the legislature raised the excise tax.

Estimated Total Consumption for Washington in packs per capita

| Year | Estimated Taxed Sales | Estimated Total Sales | Estimated Non-Taxed Sales |
|------|--------------------------|--------------------------|------------------------------|
| 1975 | 100.2 | 120.4 | 20.3 |
| 1976 | 100.3 | 119.9 | 19.6 |
| 1977 | 99.7 | 119.0 | 19.3 |
| 1978 | 101.8 | 120.6 | 18.8 |
| 1979 | 102.0 | 120.3 | 17.9 |
| 1980 | 99.2 | 117.1 | 17.9 |
| 1981 | 113.3 | 115.1 | 1.8 |
| 1982 | 105.1 | 108.4 | 3.3 |
| 1983 | 100.2 | 104.2 | 4.0 |
| 1984 | 97.0 | 101.2 | 4.2 |
| 1985 | 97.1 | 99.3 | 2.2 |
| 1986 | 93.1 | 98.4 | 5.3 |
| 1987 | 91.0 | 95.3 | 4.3 |
| 1988 | 89.0 | 93.1 | 4.1 |
| 1989 | 88.7 | 93.5 | 4.8 |
| 1990 | 84.7 | 89.5 | 4.8 |
| 1991 | 82.2 | 87.0 | 4.8 |
| 1992 | 78.9 | 83.5 | 4.6 |
| 1993 | 76.6 | 83.1 | 6.5 |
| 1994 | 71.6 | 79.4 | 7.8 |
| 1995 | 68.2 | 79.4 | 11.2 |

Policy Implications

Raising the price of cigarettes affects the rate of consumption, the amount of tax evasion and the revenue the state brings in. But in what proportion? What could we expect if the legislature were to raise the excise tax on cigarettes by twenty-five cents, for example? Assuming all the variables remain constant, and that the tax is fully passed on to the consumer as a retail price increase, the two models at the right estimate the effects.

Both the long-run national model and the short-run Washington model indicate there is a theoretical break even point for large tax increases, that is, when the price increases so much that we reach a point where the decrease in consumption is more from tax evasion than from less smoking (price elasticity).

A note on accuracy

Estimates of packs per capita are subject to fairly large estimation errors. They should not be interpreted as precise estimates, particularly in tenths of a pack. They do indicate reasonable magnitudes and should be considered the best point estimates within a range of possible values.

Impact of a Hypothetical 25¢ Increase*

1995 National Model for Washington

DOH Washington Model

Consumption and Evasion

Taxed consumption goes down 9.8 packs per capita

Taxed consumption goes down 13.5 packs per capita

77% of this (7.5 packs per capita) is a true decrease in cigarette purchases

55% of this (7.4) is a true decrease in cigarette purchases

The increase in non-taxed consumption is 2.3 packs per capita

The increase in non-taxed consumption is 6.1 packs per capita

Tax evasion accounts for less than a quarter of the decline in the long run

Tax evasion accounts for less than half of the decline in the short run

Tax Revenue

Net gain is about \$35 million annually after six months

Net gain is an annual rate of about \$13 million for the first six months

** Example assumes price increase is fully passed to consumers.*

Theoretical break even point

1995 National Model for Washington

DOH Washington Model

90¢ increase/pack
long run

40¢ increase/pack
short run

Enforcement

The ACIR study showed that vigilant enforcement can effectively counter tax evasion. But different kinds of tax evasion—casual cross-border sales, organized smuggling, purchases by non-tribal members at reservation smoke shops, military commissary purchase for those who aren't eligible, etc.—probably require different enforcement strategies.

Military Policy Change

A recently reported Department of Defense decision to change price policy on cigarettes sold in commissaries will significantly decrease the price gap between military bases and retail outlets. There is no change, however, in the model, since military sales are not separately estimated. Once the policy takes effect, a re-estimation of the model could possibly find a lower tax differential effect.

Oregon Tax Increase

Oregon recently passed a thirty cent per pack tax increase on cigarettes. This will decrease the tax differential between Washington and Oregon and will increase Washington's taxed consumption by about one pack per capita as less tax evasion occurs. Also, future tax increases in Washington will not generate as much tax evasion, as predicted by the 1995 national model for Washington and the 1995 DOH Washington model.

Cigarette Tax As a Percentage of Retail Price in Washington

